## DESCRIPTION

The XA2163 is GaAs MMIC SPDT (Single Pole Double Throw) switch which was developed for 2.4 GHz and 6 GHz dual-band wireless LAN. This device can operate at frequencies from 0.5 to 2.5 GHz, 4.9 to 6.0 GHz and 8.0 GHz, with low insertion loss and high isolation.

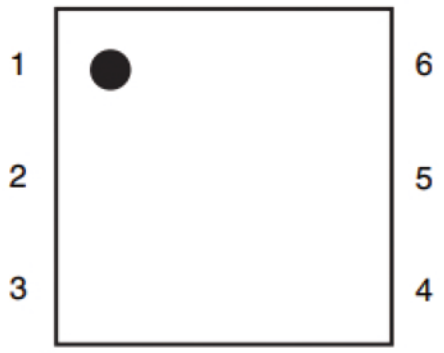
This device is housed in a 6-pin plastic TSON (Thin Small Out-line Non-leaded) package. And this package is able to high-density surface mounting.

## FEATURES

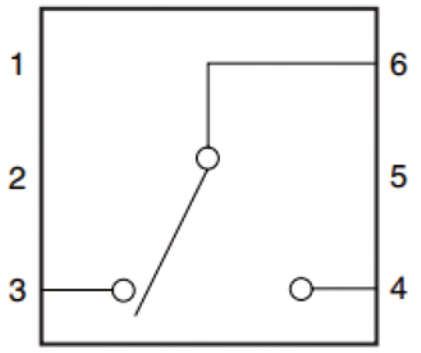
- Operating frequency : f = 0.5 to 2.5 GHz, 4.9 to 6.0 GHz and 8.0 GHz
- Switch control voltage : $V_{cont\ (H)}$ = 2.8 to 5.0 V (3.0 V TYP.)
  : $V_{cont\ (L)}$ = –0.3 to 0.3 V (0 V TYP.)
- Low insertion loss : $L_{ins}1$ = 0.40 dB TYP. @ f = 2.4 to 2.5 GHz
  : $L_{ins}2$ = 0.50 dB TYP. @ f = 4.9 to 6.0 GHz
  : $L_{ins}3$ = 0.90 dB TYP. @ f = 8.0 GHz
  : $L_{ins}4$ = 0.50 dB TYP. @ f = 0.5 to 2.5 GHz
- High isolation : ISL1 = 38 dB TYP. @ f = 2.4 to 2.5 GHz
  : ISL2 = 30 dB TYP. @ f = 4.9 to 6.0 GHz
  : ISL3 = 23 dB TYP. @ f = 8.0 GHz
  : ISL4 = 43 dB TYP. @ f = 0.5 to 1.0 GHz
  : ISL5 = 38 dB TYP. @ f = 1.0 to 2.5 GHz
- Handling power : $P_{in\ (1\ dB)}$ = +31.0 dBm TYP. @ f = 2.5 GHz, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V
  : $P_{in\ (1\ dB)}$ = +29.0 dBm TYP. @ f = 6.0 GHz, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V

## PIN CONNECTIONS AND INTERNAL BLOCK DIAGRAM

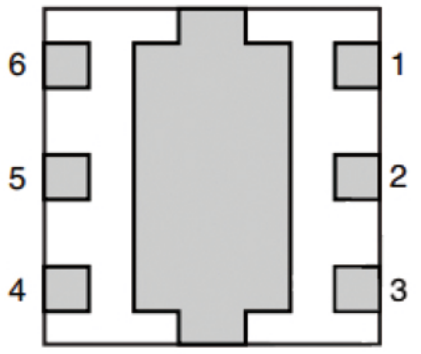
(Top View)




(Top View)




(Bottom View)




| Pin No. | Pin Name |
|---|---|
| 1 | GND |
| 2 | $V_{cont}2$ |
| 3 | OUT2 (RX) |
| 4 | OUT1 (TX) |
| 5 | $V_{cont}1$ |
| 6 | IN (ANT) |

**Remark** Exposed pad : GND

## TRUTH TABLE

| $V_{cont}1$ | $V_{cont}2$ | IN (ANT)–OUT1 (TX) | IN (ANT)–OUT2 (RX) |
|---|---|---|---|
| High | Low | OFF | ON |
| Low | High | ON | OFF |

## ABSOLUTE MAXIMUM RATINGS ($T_A$ = +25°C, unless otherwise specified)

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| Switch Control Voltage | $V_{cont}$ | –6.0 to +6.0 | V |
| Input Power | $P_{in}$ | +32 | dBm |
| Operating Ambient Temperature | $T_A$ | –45 to +85 | °C |
| Storage Temperature | $T_{stg}$ | –55 to +135 | °C |

## RECOMMENDED OPERATING RANGE ($T_A$ = +25°C, unless otherwise specified)

| Parameter | Symbol | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|
| Switch Control Voltage (H) | $V_{cont\ (H)}$ | 2.8 | 3.0 | 5.0 | V |
| Switch Control Voltage (L) | $V_{cont\ (L)}$ | –0.3 | 0 | 0.3 | V |
| Operating Frequency 1 Note 1 | f1 | 2.4 | – | 2.5 | GHz |
| Operating Frequency 2 Note 1 | f2 | 4.9 | – | 6.0 | GHz |
| Operating Frequency 3 Note 2 | f3 | – | 8.0 | – | GHz |
| Operating Frequency 4 Note 3 | f4 | 0.5 | – | 1.0 | GHz |
| Operating Frequency 5 Note 3 | f5 | 1.0 | – | 2.4 | GHz |

**Notes 1.** DC blocking capacitors = 4 pF

**2.** DC blocking capacitors = 2 pF

**3.** DC blocking capacitors = 100 pF

## ELECTRICAL CHARACTERISTICS

**($T_A$ = +25°C, $V_{cont\ (H)}$ = 3.0 V, $V_{cont\ (L)}$ = 0 V, $Z_0$ = 50 Ω, DC blocking capacitors = 4 pF, unless otherwise specified)**

| Parameter | Symbol | Test Conditions | MIN. | TYP. | MAX. | Unit |
|---|---|---|---|---|---|---|
| Insertion Loss 1 | $L_{ins}1$ | f = 2.4 to 2.5 GHz | – | 0.40 | 0.60 | dB |
| Insertion Loss 2 | $L_{ins}2$ | f = 4.9 to 6.0 GHz | – | 0.50 | 0.80 | dB |
| Insertion Loss 3 | $L_{ins}3$ | f = 8.0 GHz Note 1 | – | 0.90 | – | dB |
| Insertion Loss 4 | $L_{ins}4$ | f = 0.5 to 2.5 GHz Note 2 | – | 0.50 | – | dB |
| Isolation 1 | ISL1 | f = 2.4 to 2.5 GHz | 35 | 38 | – | dB |
| Isolation 2 | ISL2 | f = 4.9 to 6.0 GHz | 27 | 30 | – | dB |
| Isolation 3 | ISL3 | f = 8.0 GHz Note 1 | – | 23 | – | dB |
| Isolation 4 | ISL4 | f = 0.5 to 1.0 GHz Note 2 | 40 | 43 | – | dB |
| Isolation 5 | ISL5 | f = 1.0 to 2.5 GHz Note 2 | 35 | 38 | – | dB |
| Input Return Loss 1 | $RL_{in}1$ | f = 2.4 to 2.5 GHz | – | 15 | – | dB |
| Input Return Loss 2 | $RL_{in}2$ | f = 4.9 to 6.0 GHz | – | 15 | – | dB |
| Input Return Loss 3 | $RL_{in}3$ | f = 8.0 GHz Note 1 | – | 15 | – | dB |
| Input Return Loss 4 | $RL_{in}4$ | f = 0.5 to 2.5 GHz Note 2 | – | 20 | – | dB |
| Output Return Loss 1 | $RL_{out}1$ | f = 2.4 to 2.5 GHz | – | 15 | – | dB |
| Output Return Loss 2 | $RL_{out}2$ | f = 4.9 to 6.0 GHz | – | 15 | – | dB |
| Output Return Loss 3 | $RL_{out}3$ | f = 8.0 GHz Note 1 | – | 15 | – | dB |
| Output Return Loss 4 | $RL_{out}4$ | f = 0.5 to 2.5 GHz Note 2 | – | 20 | – | dB |
| 1 dB Loss Compression Input Power 1 Note 3 | $P_{in\ (1\ dB)}$ 1 | f = 2.4 to 2.5 GHz | – | +31.0 | – | dBm |
| 1 dB Loss Compression Input Power 2 Note 3 | $P_{in\ (1\ dB)}$ 2 | f = 4.9 to 6.0 GHz | – | +29.0 | – | dBm |
| Input 3rd Order Intercept Point | $IIP_3$ | | – | +55 | – | dBm |
| Switch Control Current | $I_{cont}$ | | – | 0.1 | 1.0 | μA |
| Switch Control Speed | tsw | 50% CTL to 90/10% | – | 50 | – | ns |

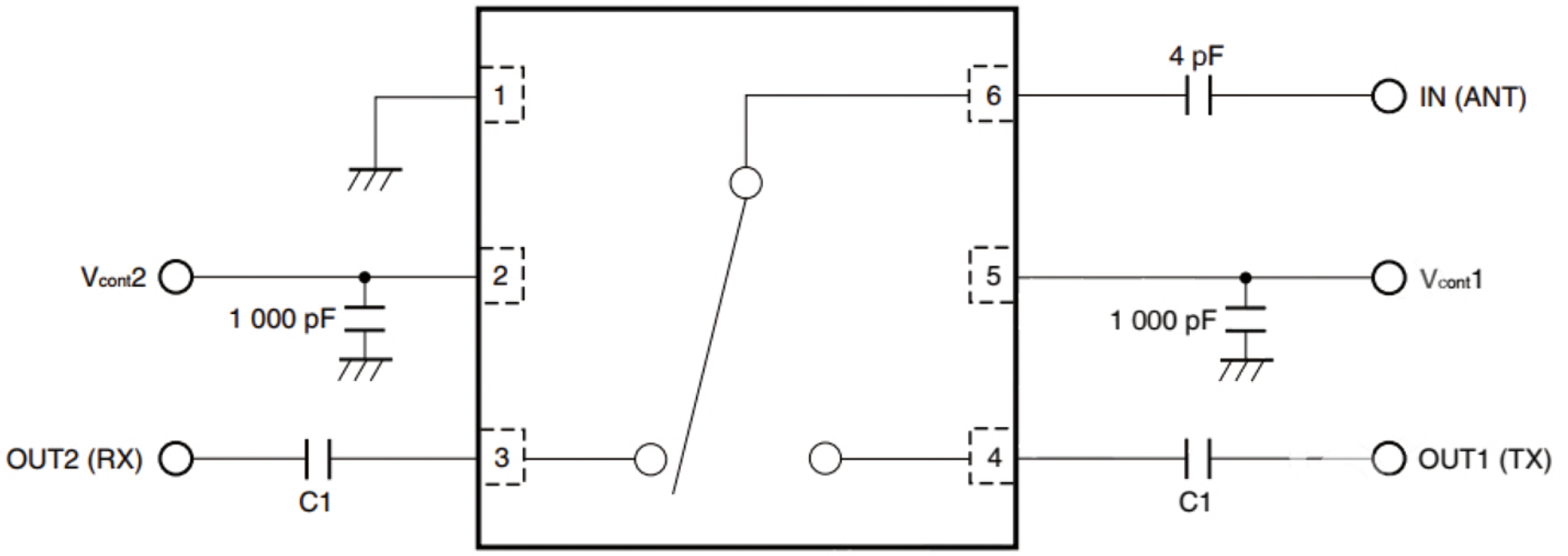
**Notes 1.** DC blocking capacitors = 2 pF

**2.** DC blocking capacitors = 100 pF

**3.** $P_{in\ (1\ dB)}$ is measured the input power level when the insertion loss increases more 1 dB than that of linear range.

**Caution This device is used it is necessary to use DC blocking capacitors.**

## EVALUATION CIRCUIT



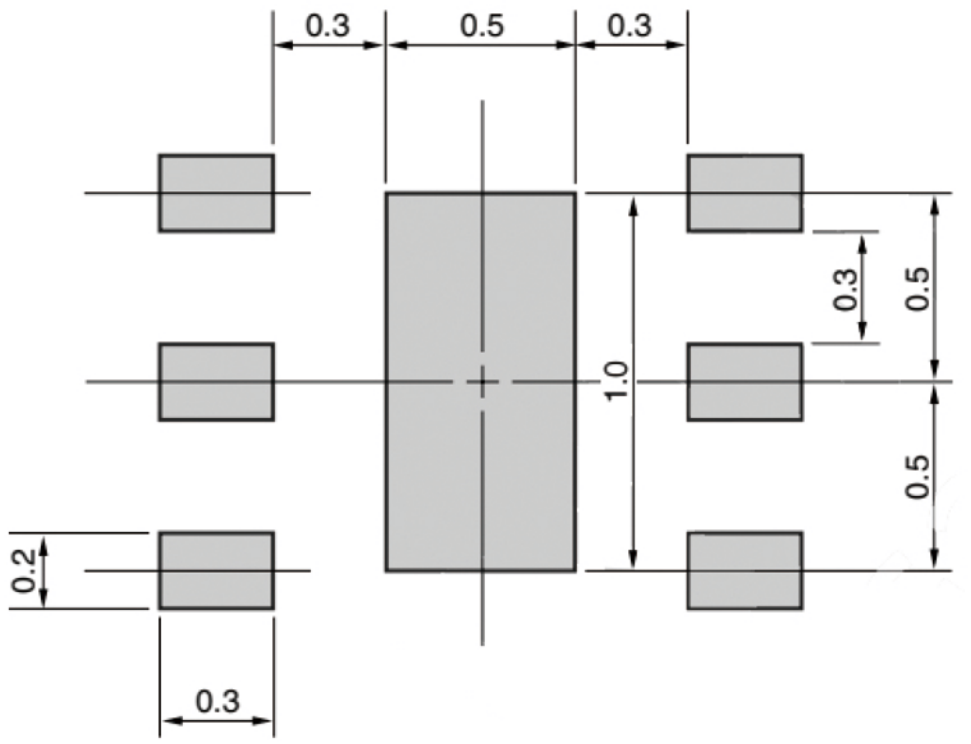

**Remark** C1: 2.4 to 2.5 GHz and 4.9 to 6.0 GHz 4 pF
8.0 GHz 2 pF
0.5 to 2.5 GHz 100 pF

The application circuits and their parameters are for reference only and are not intended for use in actual design-ins.

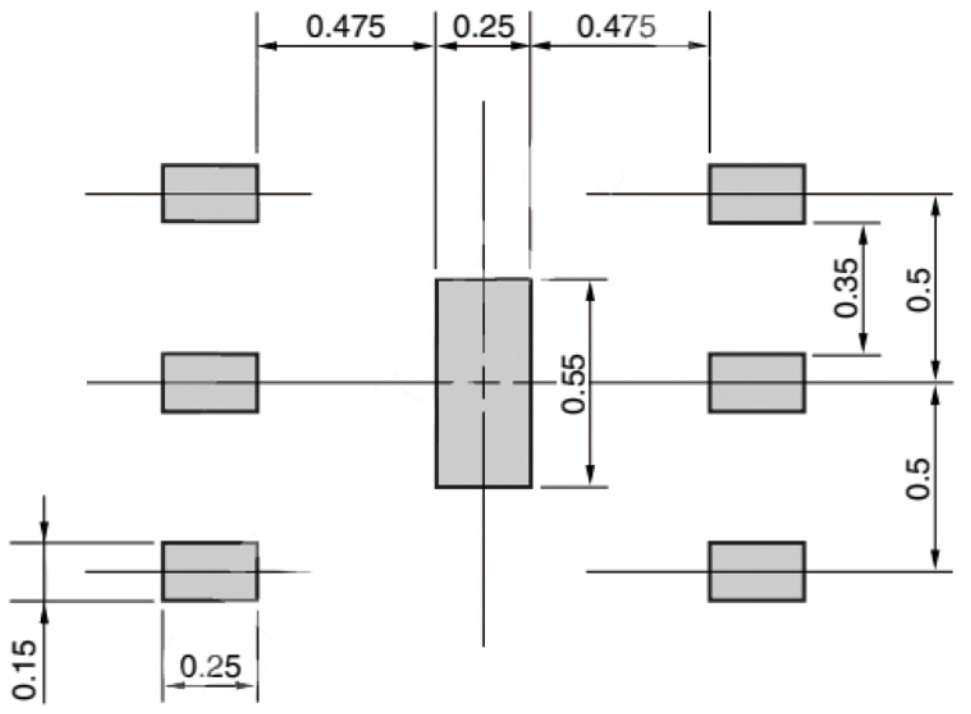
## MOUNTING PAD AND SOLDER MASK LAYOUT DIMENSIONS

### 6-PIN PLASTIC TSON (UNIT: mm)

**MOUNTING PAD**




**SOLDER MASK**



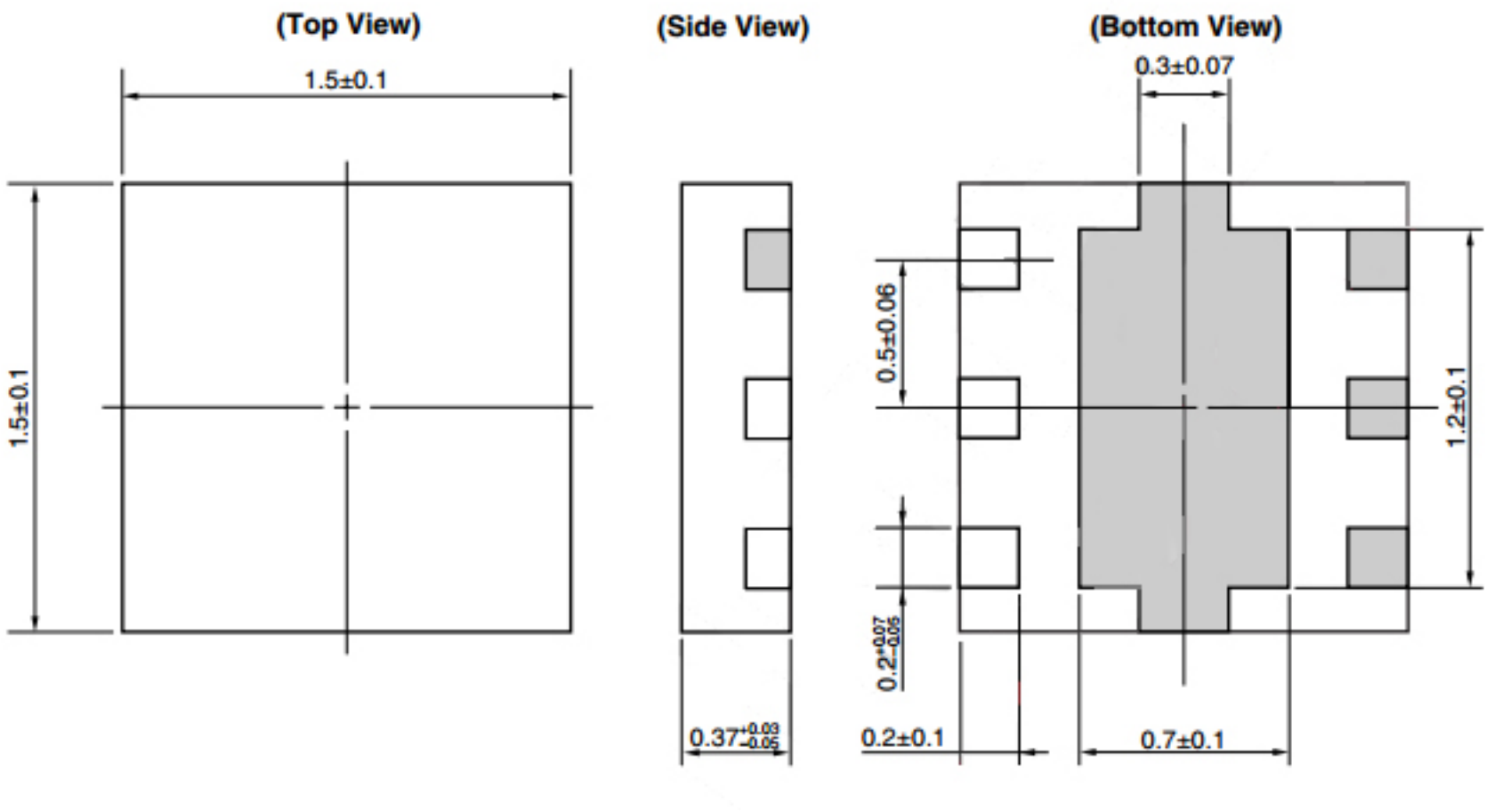

Solder thickness : 0.08 mm

**Remark** The mounting pad and solder mask layouts in this document are for reference only.
When designing PCB, please consider workability of mounting, solder joint reliability, prevention of solder bridge and so on, in order to optimize the design.

## RECOMMENDED SOLDERING CONDITIONS

| Soldering Method | Soldering Conditions | | Condition Symbol |
|---|---|---|---|
| Infrared Reflow | Peak temperature (package surface temperature) | : 260°C or below | IR260 |
| | Time at peak temperature | : 10 seconds or less | |
| | Time at temperature of 220°C or higher | : 60 seconds or less | |
| | Preheating time at 120 to 180°C | : 120±30 seconds | |
| | Maximum number of reflow processes | : 3 times | |
| | Maximum chlorine content of rosin flux (% mass) | : 0.2%(Wt.) or below | |
| Partial Heating | Peak temperature (terminal temperature) | : 350°C or below | HS350 |
| | Soldering time (per side of device) | : 3 seconds or less | |
| | Maximum chlorine content of rosin flux (% mass) | : 0.2%(Wt.) or below | |

**Caution Do not use different soldering methods together (except for partial heating).**




以上信息仅供参考.如需帮助联系客服人员。谢谢 XINLUDA